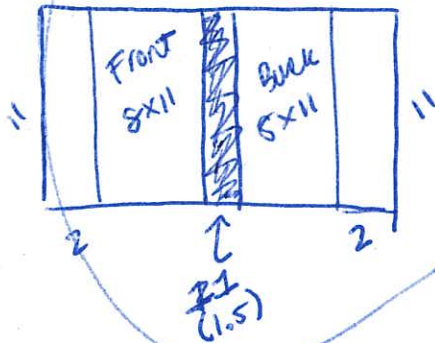


Name: Key TP: \_\_\_\_\_

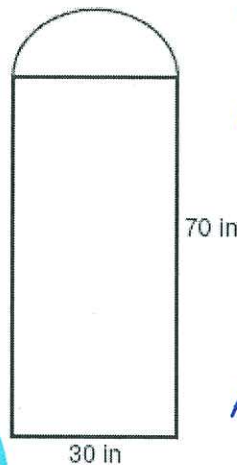
CRS	MEA 701 - Use scale factors to determine the magnitude of a size change  PPF 702 - Solve multi-step geometry problems that involve integrating concepts, planning, visualization, and/or making connections
Objective	11.4 Given the area of a figure, find the new dimensions of an increase/decreased area 11.6 Use geometric formulas to compute and find specific measures 11.7 Substitute algebraic expressions into geometric formulas, proportions, or the Pythagorean Theorem to solve for area

- 1) A publishing company is designing a book jacket for a newly published textbook. Find the area of the book jacket, given that the front cover is 8 in wide by 11 in high, the binding is 1.5 in by 11 in and the jacket will extend 2 inches inside the front and rear covers.



$$A = 2[11(8)] + 11(1.5) + 2[2(11)] = 176 + 16.5 + 44 = 236.5 \text{ in}^2$$

- 2) A Norman window is to be installed in a new home. Using the dimensions marked on the illustration; find the area of the window to the nearest tenth of an inch.



$$A_{\square} = LW = (70)(30) = 2100 \text{ in}^2$$

$$A_{\circ} = \frac{\pi r^2}{2} = \frac{(15)^2 \pi}{2} = \frac{225\pi}{2} \text{ in}^2 \approx 353.25 \text{ in}^2$$

$$A_{\square} + A_{\circ} = 2,453.3 \text{ in}^2$$

- 3) Daisy plans to build a pen for her dog. What is the area of the largest rectangular pen that she can make with 32 feet of fencing?

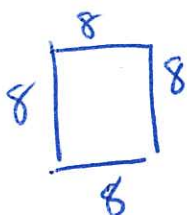
→ square

$$2L + 2W = 32$$

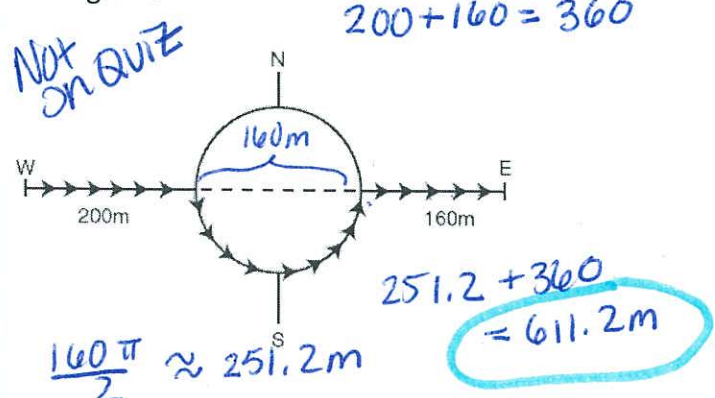
$$2(L+W) = 32$$

$$L+W = 16$$

$$A = s^2 = 64 \text{ ft}^2$$



- 4) A car is initially 200 meters due west of a roundabout (traffic circle). If the car travels to the roundabout, continues halfway around the circle, exits due east, then travels an additional 160 meters, what is the total distance the car has traveled? Refer to diagram.



PUSH IT TO THE LIMIT.



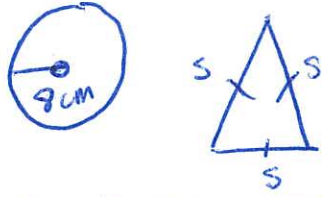
5) A farmer who owned a 20-yard-by-40-yard plot of land purchased more property such that the area doubled. The 40-yard length of the plot increased by 10 yards. How much must the 20-yard width have increased?

$$A = 20 \times 40 = 800$$

$$\frac{1600}{50} = 32 - 20 = 12 \text{ yds to increase the yds}$$

*1600 doubled area*

6) The circumference of a circle and the perimeter of an equilateral triangle are the same. If the radius of the circle is 8 cm, what is the length of the side of the triangle?



$$P = C = 2\pi r, r = 8$$

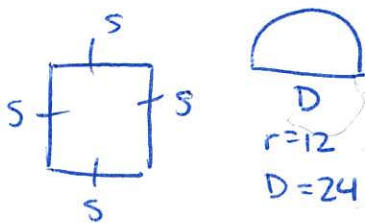
$$P = 3s$$

$$\frac{16\pi}{3} = \frac{3s}{3}$$

$$s = \frac{16\pi}{3}$$

Exact Answer:  $\frac{16\pi}{3}$  Approx Answer: 16.75 cm

7) A square and a semicircular region have the same perimeter. If the length of the radius of the semicircular region is 12, what is the length of one side of the square?



$$P = 4s$$

$$P = (\pi D + D)$$

$$4s = (24\pi + 24)$$

$$4s = 12\pi + 12 \div 4$$

Exact Answer:  $3\pi + 3$  Approx Answer: 12.42

8) A square and a semicircular region have the same perimeter. If the perimeter of the square is 20 in, what is the length of the radius of the circle?

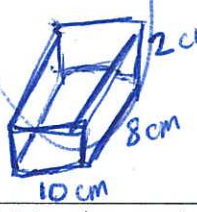
Same as #7 in terms of radius

$$4s = \frac{(2R\pi + 2R)}{2}; 4s = R\pi + R$$

$$20 \text{ in} = R\pi + R; \frac{20 \text{ in}}{(\pi + 1)} = \frac{R(\pi + 1)}{(\pi + 1)}$$

Exact Answer:  $\frac{20}{\pi + 1}$  Approx Answer: 4.83 in

9) Cynthia is going to cover her kitchen with tiles, and she plans to put the tiles next to each other so there is no space in between them. The tiles are rectangular prisms that are 2 centimeters tall by 10 centimeters wide by 8 centimeters long. If Cynthia's kitchen is a square that measures 4 meters by 4 meters, what is the minimum number of tiles she will need to fully cover her kitchen floor?



$$10 \text{ cm} \times 8 \text{ cm} = 80 \text{ cm}^2$$

$$4 \text{ m} \times 4 \text{ m} = 16 \text{ m}^2$$

$$16 \text{ m}^2 = \frac{10,000 \text{ cm}^2}{\text{cm}^2} = \frac{160,000 \text{ cm}^2}{80 \text{ cm}^2}$$

2,000 tiles

11) A teacher wants to cover his bulletin board with student work. The board is 5 feet wide and 3 feet tall. Without overlapping, how many student papers can he staple onto the board if they are each 8.5 x 11 inches?

$$5 \times 3 = 15 \text{ ft}^2$$


$$8.5 \times 11 = 93.5 \text{ in}^2$$

$$15 \text{ ft}^2 = \frac{144 \text{ in}^2}{1 \text{ ft}^2} = 216 \text{ in}^2$$

$$216 \text{ in}^2 / 93.5 \text{ in}^2 = 23.10$$

23 papers

12) The diameter of a circle and the hypotenuse of an isosceles right triangle have the same length. If the length of one of the legs of the isosceles right triangle is 5 in, what is the circumference of the circle? Round to the nearest tenth.



$$45-45-90$$

$$C = 2\pi r = \pi d = \pi(5\sqrt{2}) = 5\pi\sqrt{2} = 22.2$$

PUSH IT TO THE LIMIT.

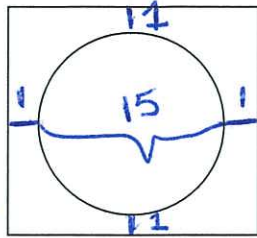


13) The box for a 15 inch pizza (a pizza 15 inches in diameter) from Papa John's is square-shaped and leaves room for one inch on each side of the pizza. How many square inches is the area of the base of the pizza box?

$$A_{\text{Box}} = LW$$

$$= 17^2$$

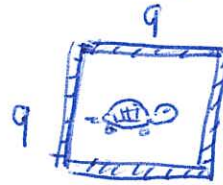
$$= 289 \text{ in}^2$$



14) Elana plans to build a pen for her pet turtle. What is the area of the largest rectangular pen that she can make with 36 feet of fencing?

$$2(l+w) = 36$$

$$l+w = 18$$



$$A = s^2 = 81 \text{ ft}^2$$

15) Paris Hilton owns a 30-yard-by-60-yard island off the coast of Florida. Recently she purchased the property next to her tripling the area of her island. As a result, the 30-yard length increased by 30 yards. How much did the width increase by?

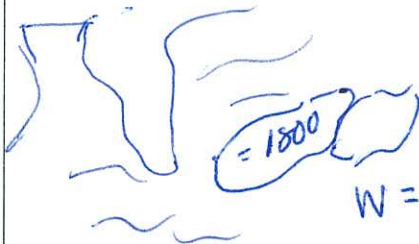
$$A = 30 \times 60 = 1800$$

$$\times 3$$

$$5400$$

$$\div 60$$

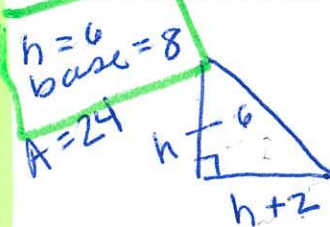
$$= 90$$



$$W = 90 - 60$$

$$= \text{increased by } 30$$

16) The area of a triangle is 24 square units and the base of the triangle is 2 units longer than the height. What are the values of the base and the height?



\* Good quiz question

$$h^2 + 2h - 48 = 0$$

$$(h+8)(h-6) = 0$$

$$h = 6$$

$$h = -8$$

$$\frac{1}{2}(h(h+2)) = 24$$

$$\frac{1}{2}(h^2 + 2h) = 24$$

$$h^2 + 2h = 48$$

17) The area of a rug is  $36 \text{ m}^2$  and each of its side lengths are whole meters long. State whether the following perimeters are possible and explain why. Show all work and include a diagram for each.

a. 24 m Yes!

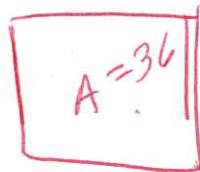
$$2l + 2w = 24$$

$$l + w = 12$$

$$6 + 6 = 12 \checkmark$$

$$A = 6 \times 6 = 36$$

b. 26 m



$$2(l+w) = 26$$

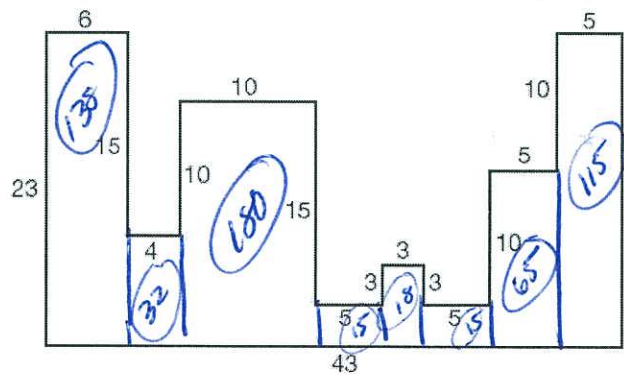
$$l+w = 13$$

$$l=7 \quad w=6 \quad A=42$$

Yes! whole numbers only

Factors of 36: 1, 2, 3, 4, 6, 9, 12, 18, 36

CHALLENGE PROBLEM: Find the area of the region.



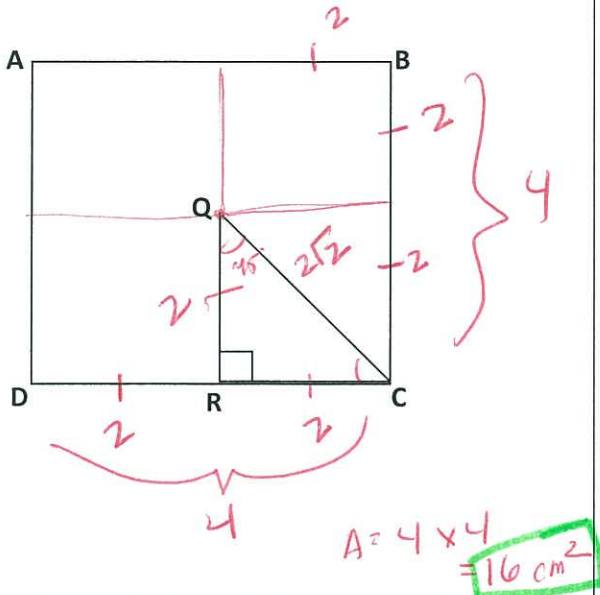
$$138 + 32 + 180 + 15 + 18 + 15 + 65 + 115 = 578 \text{ units}^2$$

(1<sup>st</sup> group with a correct worked out solution will receive 3 points)

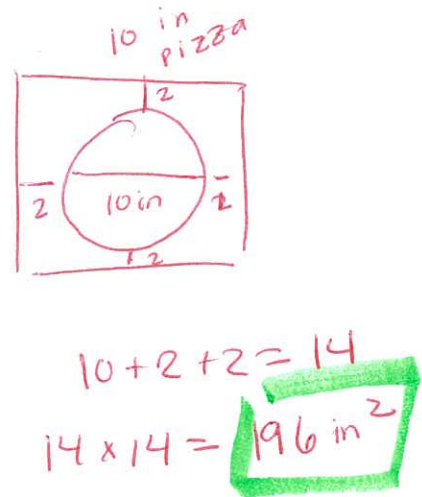
PUSH IT TO THE LIMIT.

Practice Quiz Questions:

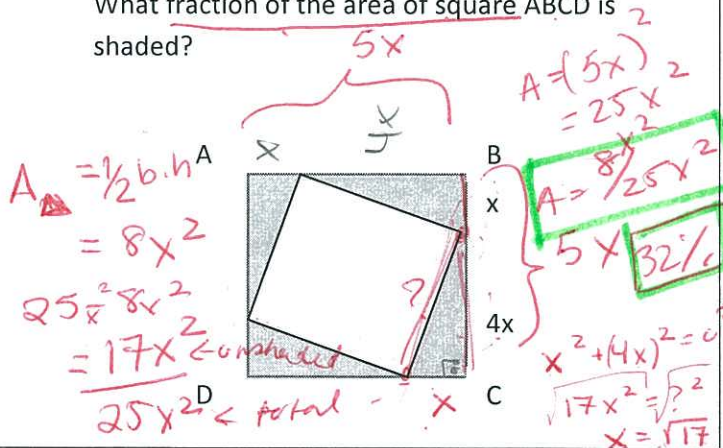
1. In the figure below, Q is the center of square ABCD, R is the midpoint of DC, and  $\angle QCR = 45^\circ$ . Find the area of square ABCD if  $QC = 2\sqrt{2}$  cm.



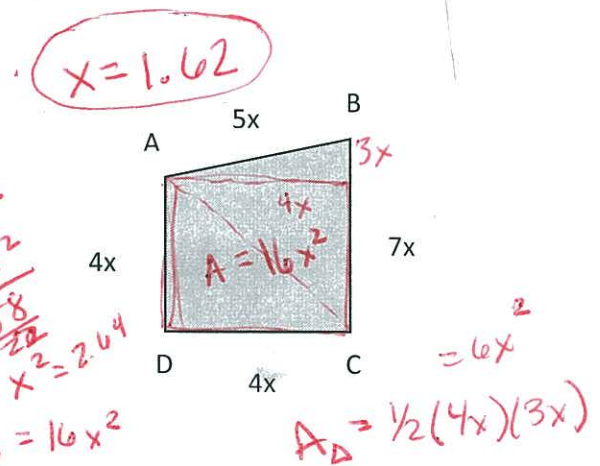
2. Pizza Hut sells 10-inch pizzas in a box that leaves 2 inches on each side of the pizza. How many square inches is the area of the base of the 10-inch pizza box?



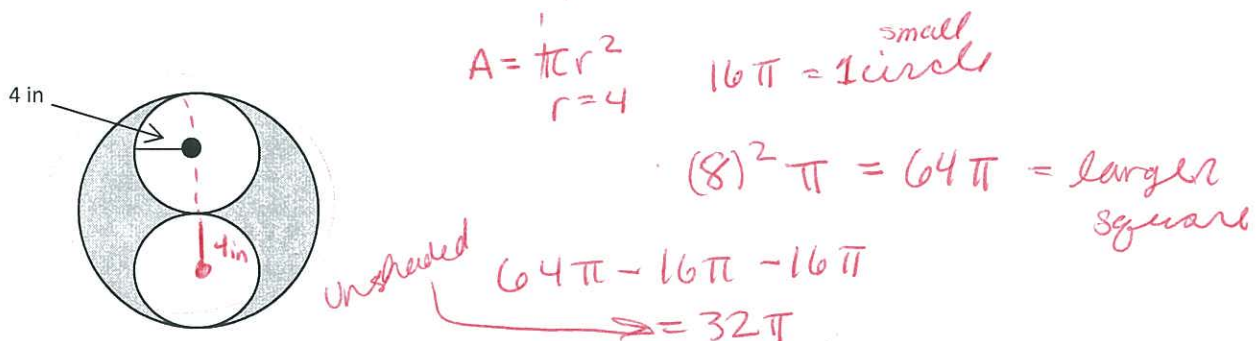
3. In the figure below, ABCD is a square. Points on each pair of adjacent sides of ABCD are connected to form 4 congruent right triangles with one leg four times as long as the other, as shown below. What fraction of the area of square ABCD is shaded?



4. In the quadrilateral ABCD shown below, the side lengths are as shown. If the area of ABCD is 58 square units, what is the value of  $x$ ?



5. In the figure below, two white congruent circles just fit into the gray circle. What is the area that appears gray?



PUSH IT TO THE LIMIT.